Advanced Trigonometric Identities

Product-to-Sum Identities

$\sin(a)\sin(b) = 1/2\ [\cos(a - b) - \cos(a + b)]$

$\cos(a)\cos(b) = 1/2\ [\cos(a - b) + \cos(a + b)]$

$\sin(a)\cos(b) = 1/2\ [\sin(a + b) + \sin(a - b)]$

$\cos(a)\sin(b) = 1/2\ [\sin(a + b) - \sin(a - b)]$

Sum-to-Product Identities

$\sin(a) + \sin(b) = 2\sin((a + b)/2)\cos((a - b)/2)$

$\sin(a) - \sin(b) = 2\cos((a + b)/2)\sin((a - b)/2)$

$\cos(a) + \cos(b) = 2\cos((a + b)/2)\cos((a - b)/2)$

$\cos(a) - \cos(b) = -2\sin((a + b)/2)\sin((a - b)/2)$

Half-Angle Identities

$\sin^2(x) = (1 - \cos(2x)) / 2$

$\cos^2(x) = (1 + \cos(2x)) / 2$

$\tan^2(x) = (1 - \cos(2x)) / (1 + \cos(2x))$